# Materials Processing for Ferromagnetic Wide Bandgap Nitride Heterostructures

Stephen J.Pearton, University of Florida, DMR-0101438

We are developing methods of processing new dilute magnetic semiconductor materials such as (Ga,Mn)N that exhibit room temperature ferromagnetism and that may have applications in new generations of electronic and photonics devices that integrate magnetism, such as polarized light-emitters, non-volatile memories and magnetic devices with gain. A first step is to prove the magnetism in the (Ga, Mn)N is not due to second phases. The results at right are consistent with (Ga, Mn)N being single-phase.

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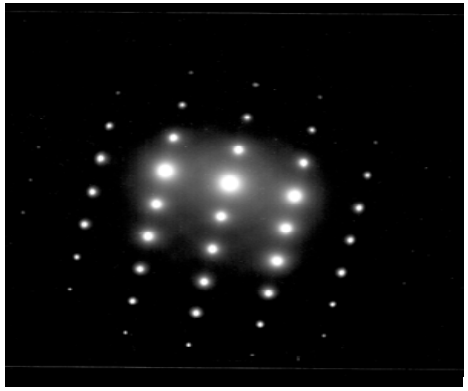
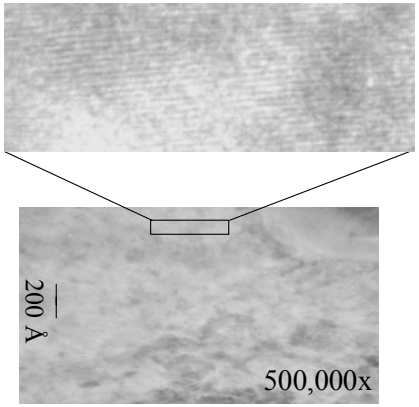


Selected area diffraction pattern from (Ga,Mn)N.




High resolution TEM of (Ga,Mn)N showing only single-phase material.

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**Education:**

Two undergraduates (Kelly Ip and Don Kent) and two graduate students (Kwang Baik and Kelly Ip, who stayed on to do graduate work). Don Kent is now employed by Intel Corporation, while Kwang is employed by Applied Materials. Kelly Ip recently spent a summer internship at Sandia National Laboratories on the MESA program designed to encourage promising young scientists to consider careers at national laboratories.

**Outreach:**

The PI presented a general interest talk on "The Wonderful World of Semiconductors"and designed some simple hands-on experiments for participants in which they could measure resistance of (Ga, Mn)N at different temperatures or in the presence of various types of light.

Participants in the 2003 UF Physics Open House.